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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/019,201	12/20/2001	Kazuhiro Maeno	TIC-0010	9902

7590 11/14/2003

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EXAMINER

CHU, CHRIS C

ART UNIT PAPER NUMBER

2815

DATE MAILED: 11/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/019,201

Applicant(s)

MAENO ET AL.

Examiner

Chris C. Chu

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 - 10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Request for Continued Examination

1. A request for continued examination (RCE) under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 11, 2003 has been entered. An action on the RCE follows.

2. Applicant's amendment filed on September 11, 2003 has been received and entered in the case.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2, 4 and 6 - 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Sugawara et al.

Regarding claim 1, Sugawara et al. discloses in Figs. 3 - 5, column 4, lines 24 - 28 and column 5, lines 1 - 25 a semiconductor device, comprising:

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- a plurality of semiconductor elements (3, at the right-side) arranged on a substrate (2, at the right-side); and
- a main current electrode (an electrode on 11, at the right-side, which is connected to the element 6b) which is arranged near said plurality of semiconductor elements and vertically apart from the surface of the substrate, wherein;
- each of said plurality of semiconductor elements (3, at the right-side) and said main electrode are electrically connected (6b), and
- wherein said main current electrode is arranged immediately above one of said plurality of semiconductor elements (3, at the right-side) or wiring pattern (Cu patterns on 2) connected to the one of said plurality of semiconductor elements.

Regarding claim 2, Sugawara et al. discloses in Fig. 3 and Fig. 4 each of said plurality of semiconductor elements and said main current electrode being connected by wire bonding (6b).

Regarding claim 4, Sugawara et al. discloses in Fig. 3 and Fig. 4 a thermal conductor member (1) at a bottom of the semiconductor device, wherein said plurality of semiconductor elements are directly or indirectly connected to said thermal conductor member so that they are thermally coupled.

Regarding claim 6, Sugawara et al. discloses in Fig. 3 and Fig. 4 said plurality of semiconductor elements being arranged in one row or a plurality of rows.

Regarding claim 7, Sugawara et al. discloses in Figs. 3 - 5, column 4, lines 24 - 28 and column 5, lines 1 - 25 a semiconductor device including one or a plurality of semiconductor elements (3), comprising:

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- a substrate (2) on which the one or the plurality of semiconductor elements are arranged;
- a case (4) that is arranged in a predetermined position relative to said substrate so that one of the plurality of semiconductor elements are surrounded; and
- a metal member (wiring patterns on the element 11) on which a main current electrode (an electrode on 11, especially at the middle and right-side, which is a part of the wiring patterns and connected to the element 6b) of the one of the plurality of semiconductor elements and a terminal (a pad which is a part of the wiring pattern on 11 and connected to the element 14) for electrically connecting said semiconductor device and a circuit external to said semiconductor device are formed integrally,
- wherein said member is arranged in a position apart from said substrate by using said case without directly contacting said substrate.

Regarding claim 8, Sugawara et al. discloses in Figs. 3 - 5 said metal member being arranged above the one or the plurality of semiconductor elements or a wiring pattern connected to the one or the plurality of semiconductor elements.

Regarding claim 9, Sugawara et al. discloses in Figs. 3 - 5 said metal member and the semiconductor device being electrically connected by wire bonding (6b).

Regarding claim 10, Sugawara et al. discloses in Figs. 3 - 5 said case (4) including a frame portion surrounding the one or the plurality of semiconductor elements; and said metal member is fixed to the frame portion of said case.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugawara et al. in view of Bryan.

Sugawara et al. discloses the claimed invention except for the plurality of semiconductor elements being switching elements. However, Bryan teaches in column 5, lines 59 ~ 60 semiconductor elements being switching elements. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Sugawara et al. by using the semiconductor elements to be switching elements as taught by Bryan. The ordinary artisan would have been motivated to modify Sugawara et al. in the manner described above for at least the purpose of improving crosspoint switching circuit (column 5, line 56).

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugawara et al. in view of Dubelloy.

Sugawara et al. discloses the claimed invention except for the thermal conductor member being formed with a ceramic material. However, Dubelloy teaches in column 3, lines 31 ~ 33 a thermal conductor member being formed with a ceramic material. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Sugawara et al. by using the ceramic material for the thermal conductor member as taught by

Bryan. The ordinary artisan would have been motivated to modify Sugawara et al. in the manner described above for at least the purpose of providing a good electrical insulator (column 3, line 32).

Response to Arguments

8. Applicant's arguments filed on September 11, 2003 have been fully considered but they are either moot in light of the new grounds of rejection or are not persuasive.

On page 6, applicant argues "Sugawara fails to disclose a 'main current electrode [arranged] *immediately above* one of said plurality of semiconductor elements or wiring pattern connected to the one of said plurality of semiconductor elements' as claimed." This argument is not persuasive because the electrode (an electrode on 11, at the right-side, which is connected to the element 6b) of Sugawara is *immediately above* one of said plurality of semiconductor elements (3, at the right-side). Since Sugawara recites all the limitations of claim 1 as amended (see paragraph 4 of this Office action for details), Sugawara anticipates claim 1.

Further, applicant argues "applicants respectfully note that the metal member of claim 7 has 'a main current electrode ... and a terminal ... formed integrally' thereon, and is 'arranged in a position apart from said substrate by using [the] case *without directly contacting [the] substrate.*' Sugawara does not disclose these structural limitations." This argument is not persuasive. Sugawara clearly shows in Figs. 3 - 5 a main current electrode (an electrode on 11, especially at the middle and right-side, which is a part of the wiring patterns and connected to the

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element 6b) ... and a terminal (a pad which is a part of the wiring pattern on 11 and connected to the element 14) ... formed integrally. Furthermore, Sugawara clearly shows in Fig. 3 the metal member (wiring patterns on the element 11) is arranged in a position apart from said substrate (2) by using [the] case (4) *without directly contacting the substrate*.

For the above reasons, the rejection is maintained.

Conclusion

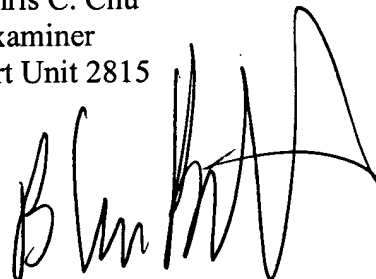
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is (703) 305-6194. The examiner can normally be reached on M-F (10:30 - 7:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7382.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

C.C.
11/11/03 8:26:01 PM

Chris C. Chu
Examiner
Art Unit 2815

A handwritten signature in black ink, appearing to read 'Bradley Baumeister', with a large, stylized flourish at the end.

**BRADLEY BAUMEISTER
PRIMARY EXAMINER**